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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/891,134	06/25/2001	Peter Brian Denyer	00ED18552605	8833

27975 7590 06/16/2006

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EXAMINER

HENN, TIMOTHY J

ART UNIT	PAPER NUMBER
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2622

DATE MAILED: 06/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/891,134	<b>Applicant(s)</b> DENYER ET AL.	
	<b>Examiner</b> Timothy J. Henn	<b>Art Unit</b> 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 32-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 32-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 September 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

In the response filed Applicant argues that Yadid-Pechet teaches away from the use of correlated double sampling (CDS) based on column 7, lines 32-43. The examiner notes that even if this section is interpreted as Applicant suggests, Yadid-Pechet, at best, teaches away from the use of on-chip CDS.

Applicant further argues that new drawings are not required since further illustration is not essential for a proper understanding of the method. Applicant appears to be quoting from 37 CFR 1.83 which states "[h]owever, conventional features disclosed in the description and claims, where their detailed illustration is not essential for a proper understanding of the invention, should be illustrated in the drawing in the form of a graphical drawing symbol or a labeled representation (e.g., a labeled rectangular box)". The examiner notes that this part of 1.83 does not remove the requirement for drawings showing the claimed features and would only apply if Applicant considers the claimed method to be "conventional features" of the invention. Therefore, the arguments with respect to the drawings are not considered persuasive.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the claimed method of

operating a solid state image sensor array must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 103***

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 32, 33, 35, 36, 38 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hurwitz (US 6,067,113) in view of Yadid-Pecht et al. (US 6,115,065)

in view of Kozlowski et al. (US 6,535,247).

**[claim 36]**

Regarding claim 36, Hurwitz discloses a solid state image sensor comprising: a plurality of active pixels (Figure 1, Item 2), a vertical shift register connected to rows of the plurality of active pixels (Figure 1, Item 20); a horizontal shift register connected to columns of said plurality of active pixels (Figure 1, Item 22). However, Hurwitz does not disclose scanning circuitry which resets and immediately reads a preliminary output from each pixel, reads a first output after a first period of time, reads a second output after a second period of time which overlaps the first period of time, determines a difference between the preliminary output and each of the first and second outputs to form first and second sets of image data and combines the first and second sets of image data as claimed.

Yadid-Pecht discloses an image sensor with a scanning system which obtains first and second outputs without resetting the pixel between outputs and combines the first and second outputs into a final output in order to increase dynamic range of the image (c. 7, 32-54). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the image sensor of Hurwitz with the scanning system of Yadid-Pecht in order to obtain image data with increased dynamic range. However, Hurwitz in view of Yadid-Pecht does not disclose outputting a preliminary output and determining a difference between the preliminary output and the first and second sets of image data.

However, it is known in the art to implement correlated double sampling circuits to remove kTC from readout image signals from image sensors. Kozlowski discloses the use of off-chip memory and processing elements to store reset levels and digitally subtract the stored reset values from signal values to obtain image signals free from kTC noise (c. 2, l. 47 - c. 3, l. 8). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement off-chip correlated double sampling in the system of Hurwitz in view of Yadid-Pecht in order to obtain image data free from kTC noise.

**[claim 38]**

Regarding claim 38, Yadid-Pechet discloses that the image sensor continues integrating charge after the first and second readouts without resetting, therefore it can be seen that the image sensing array is continuously exposed to light as claimed (c. 7, ll. 32-54).

**[claim 39]**

Regarding claim 39, Hurwitz discloses the incorporation of the image sensor into a camera (c. 9, ll. 10-23).

**[claims 32 and 35]**

Claims 32 and 35 are method claims corresponding to apparatus claims 36 and 38. Therefore, claims 32 and 35 are analyzed and rejected as previously discussed with respect to claims 36 and 38.

**[claims 33]**

Regarding claim 33, Yadid-Pechet teaches reading at least a third output from each pixel after a third period of time and without resetting each pixel to obtain a third set of image data having a third dynamic range (c. 7, ll. 32-54,  $T_{3int}$ ); and combining the first second a third sets of data (c. 6, ll. 24-31; c. 7, ll. 7-16). Following the teachings of Kozlowski it would have been obvious to subject this third readout to the same correlated double sampling in order to remove kTC noise.

5. Claims 34 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hurwitz (US 6,067,113) in view of Yadid-Pecht et al. (US 6,115,065) in view of Kozlowski et al. (US 6,535,247) in view of Applicant's Admitted Prior Art (AAPA).

**[claim 37]**

Regarding claim 37, Hurwitz in view of Yadid-Pechet in view of Kozlowski discloses all limitations except for exposure periods which are integer multiples of a predetermined lighting flicker period. However, AAPA discloses that CMOS image sensors suffer from horizontal banding interference when the exposure time is not an integer multiple of a light source flicker period (Page 2, Line 21 - Page 3, Line 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the integration times of the image readout of Hurwitz in view of Yadid-Pechet in view of Kozlowski integer multiples of a lighting flicker period to correct horizontal banding interference in the image.

**[claim 34]**

Claim 34 is a method claim corresponding to apparatus claim 37. Therefore, claim is analyzed and rejected as previously discussed with respect to claim 37.

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following further shows the current state of the art in image sensors with multiple outputs per frame:

- |     |             |              |
|-----|-------------|--------------|
| i.  | Wang et al. | US 6,972,794 |
| ii. | Ide et al.  | US 7,030,923 |

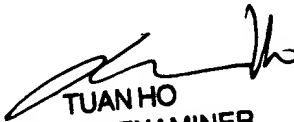
7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Henn whose telephone number is (571) 272-7310. The examiner can normally be reached on M-F 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TJH  
6/5/2006

  
TUAN HO  
PRIMARY EXAMINER